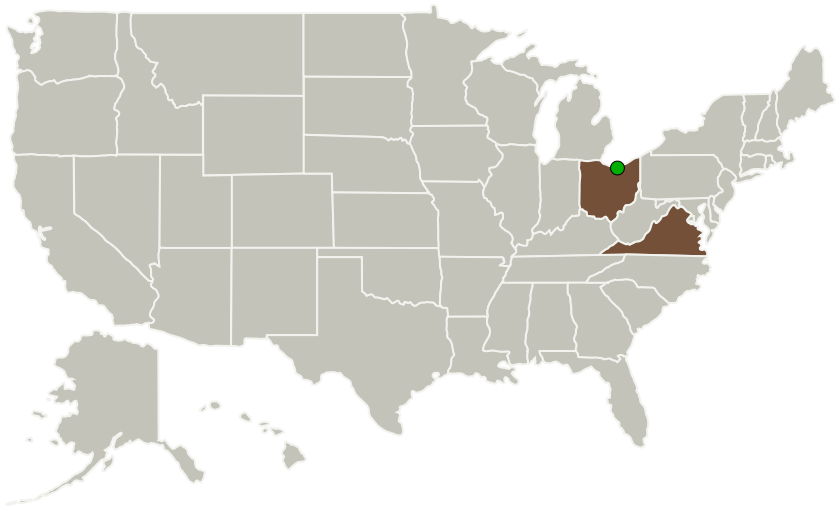
Rapid In-Place Composite Rotor Damage Detection, Phase II

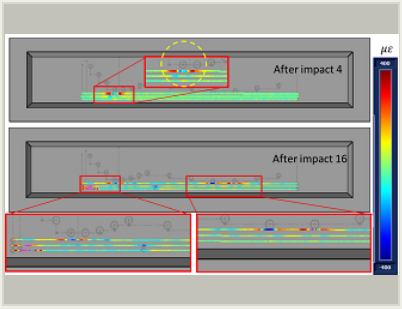
Completed Technology Project (2017 - 2019)

Project Introduction

Luna Innovations is proposing to further develop the Rapid In-Place Composite Rotor Damage Detection (RIPCoRDD) System for determining and tracking the structural health of composite rotorcraft blades and other composite structures. There is a need for accurate, reliable assessments of the condition of composite parts which may have been damaged through impacts, fatigue, or abrasion. This is especially true for cases in which the damage may not be visible from the surface. The RIPCoRDD system is designed such that it will enable composite rotor damage detection in seconds with absolutely no increase in weight, power consumption, or volume of the rotorcraft. The core of the RIPCoRDD device is a unique, distributed, high-definition fiber optic strain sensor (HD-FOS) which provides spatially dense strain measurements (every 1.25-2.5 mm) within the composite structure, coupled with a ground based installation of Luna's proven optical frequency domain reflectometry (OFDR) instrumentation. Commercialization will focus on transitioning the technology first to OEM manufacturers for non-destructive inspection applications, followed by deployment to rotorcraft end users for lifetime monitoring and diagnostics.

Primary U.S. Work Locations and Key Partners





Rapid In-Place Composite Rotor Damage Detection, Phase II Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Luna Innovations, Inc.	Lead Organization	Industry	Roanoke, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

Project Transitions

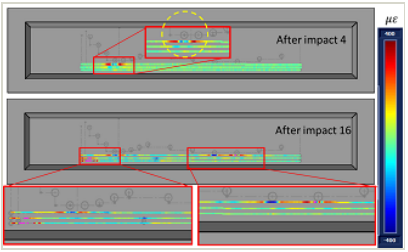
April 2017: Project Start

October 2019: Closed out

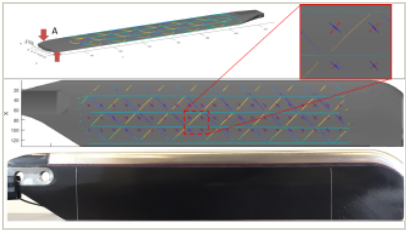
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140918)*

Images



Briefing Chart Image
Rapid In-Place Composite Rotor Damage Detection, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/130715)*



Final Summary Chart Image
Rapid In-Place Composite Rotor Damage Detection, Phase II *(https://techport.nasa.gov/image/129738)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Luna Innovations, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

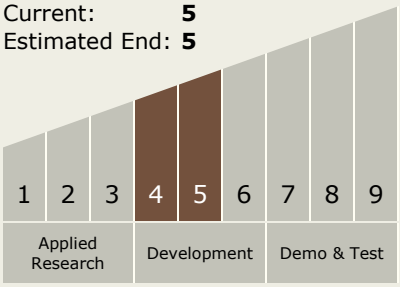
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Daniel Kominsky

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.2 Test and Qualification
    - TX13.2.1 Mechanical/Structural Integrity Testing

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System